AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of determining a concavity and/or a convexity on a sample, comprising the steps of:

scanning a portion of the [[a]] sample including a plurality of convex ~~pattern~~ patterns formed thereon with a charged particle beam;

forming a profile waveform based on charged particles emitted from the scanned portion of the sample;

forming a derivative waveform based on the formed profile waveform;

comparing a first distance, along a baseline, between a peak top of a first side of the derivative waveform and a position where the derivative waveform converges, with a second distance, along the baseline, between a peak top of a second side of the derivative waveform and a position where the derivative waveform converges, about one side of the convex pattern; and

determining when the foot portion on one side of said peak converges more gradually than the foot portion on the other side, that a portion of said sample corresponding to a non-peak portion of the profile waveform which is continuous from the foot portion on the one side to be a convex portion, and that a portion of the sample corresponding to a non-peak portion of the profile waveform which is continuous from the foot portion on the other side is a concave portion that a convex part is on the first side of the formed waveform and that a concave part is on the second side thereof, if the first distance is greater than the second distance.

2. (Currently Amended) A method of determining a concavity and/or a convexity on a sample, comprising the steps of:

scanning a portion of the [[a]] sample including a plurality of concave ~~pattern~~ patterns formed thereon with a charged particle beam;

forming a profile waveform based on charged particles emitted from the scanned portion of the sample;

forming a derivative waveform based on the formed profile waveform;

comparing a first distance, along a baseline, between a peak top of a first side of the derivative waveform and a position where the derivative waveform converges, with a second distance, along the baseline, between a peak top of a second side of the derivative waveform and a position where the derivative waveform converges about one side of the concave pattern;

determining that a concave part is on the first side of the formed waveform and that a convex part is on the second side thereof, if the first distance is smaller than the second distance.

3. (Previously Presented) The method of determining the concavity and/or convexity on a sample according to claim 1 or 2, wherein the charged particle beam is incident on the plane of a substrate perpendicularly.

4. (Original) The method of determining the concavity and convexity on a sample according to claim 3, wherein said profile waveform is created based on a charged particle emitted from a location of said sample that has been scanned as the charged particle beam that is perpendicularly incident on the sample is scanned by a scanning deflector.

5. (Original) The pattern position detection method according to claim 1 or 2, wherein the position of a pattern on said sample is identified based on the information about the concave and/or convex portions that have been determined.

6. (Original) The pattern position detection method according to claim 1 or 2, wherein a convex-concave pattern formed on a substrate is scanned by a charged particle beam, a profile waveform is created based on a reflected or secondary charged particle emitted from a scanned location, and a specific position of said pattern on said substrate is detected based on pattern convex-concave information obtained by said method of determining the concavity and convexity on a sample.

7. (Original) The pattern position detection method according to claim 6, wherein a comparison is made with concavity-convexity information about a pre-registered model, in order to detect a specific position on said pattern on said sample.

8. (Original) The pattern position detection method according to claim 6, wherein a comparison is made with the profile shape of a pre-registered model, and an error is detected if an evaluation value indicating the difference in their profile shapes exceeds a predetermined value.

9. (Original) The pattern position detection method according to claim 6, wherein a comparison is made with the number of edges in a pre-registered model, and an error is detected if the numbers of edges exceed a predetermined value.

10. (Currently Amended) A method of determining a concavity and/or a convexity on a sample, comprising the steps of:

scanning a portion of the [[a]] sample including ~~comprising~~ a plurality of convex and/or concave patterns formed thereon with a charged particle beam;

forming a profile waveform based on a charged particles emitted from the scanned portion of the sample;

forming a derivative waveform based on the formed of said profile waveform;

detecting a pair of continuous positive and negative peaks in the differentiated waveform;

comparing for each pair of [[the]] continuous positive and negative peaks in the derivative waveform, a first distance in a negative peak of a pair of the continuous positive and negative peaks between a peak position and a position where the derivative waveform reaches zero or converges, with a second distance in a positive peak of the pair of the continuous positive and negative peaks between a peak position and a position ~~positive~~ where the derivative waveform reaches zero or converges; and

determining that a convex part is a portion on the sample that corresponds to a non-peak portion of the derivative waveform where a negative peak converges, and that a concave part is a portion on the sample that corresponds to a non-peak portion of the derivative waveform where a positive peak converges, if the first distance is greater ~~longer~~ than the second distance.

11. (Previously Presented) A charged particle beam apparatus comprising:

a charged particle source,

a scanning deflector for scanning a charged particle beam emitted by said charged particle source,

a detector for detecting a charged particle emitted by a sample irradiated with said charged particle beam, and

a control processor that comprises:

a profile waveform forming means for forming a profile waveform of a portion of the sample that has been irradiated with a charged particle beam based on a detection output of the detector;

a derivative waveform forming means for forming a derivative waveform based on the formed profile waveform;

a comparison means for comparing a first distance, along a baseline, between a peak top of a first side of the derivative waveform and a position where the derivative waveform converges, with a second distance, along the baseline, between a peak top of a second side of the derivative waveform and a position where the derivative waveform converges; and

a determination means for determining that a convex part is on the first side of the formed waveform and that a concave part is on the second side thereof, if the first distance is greater than the second distance.